REMARKS

Reconsideration and allowance of the above-identified application are respectfully requested. Upon entry of this Amendment, claims 1-3, 5-15 and 17-40 will be pending.

Applicant appreciates the Examiner's indication that claims 7-9, 12, 19-21 and 24 include allowable subject matter. Accordingly, dependent claims 7, 12, 19 and 24 are written in independent form as new claims 25, 28, 29 and 32, respectively. Claims 8 and 9, which depend from claim 7, are written as new claims 26 and 27 which depend from claim 25, and claims 20 and 21, which depend from claim 19, are written as new claims 30 and 31 which depend from claim 29. Hence, claims 25-32 should be in condition for allowance.

However, claims 1-6, 10, 11, 13-18, 22 and 23 are now rejected under U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,108,561 to Mallinckrodt et al. in view of U.S. Patent No. 6,219,343 to Honkasalo et al., of record, in further view of newly cited U.S. Patent No. 6,574,266 to Haartsen. This rejection is respectfully traversed.

Specifically, as discussed in more detail below, Applicant respectfully submits that as admitted by the Examiner, the Mallinckrodt et al. and Honkasalo et al. patents relate to CDMA cellular networks, not to a wireless ad-hoc communication network as recited in the claims, and therefore, no motivation exists to employ the techniques described in these patents in a system as described in the Haartsen patent that is capable of establishing ad-hoc sessions. Furthermore, Applicant respectfully submits that even if such motivation did exist, the combined teachings would not have achieved the embodiments of the present invention even as recited in amended independent claims 1 and 13, because neither patent teaches or suggests *predicting* of path loss of a link *as a function of time* as now recited in these claims, and then determining a noise factor

representing noise at a destination node and calculating the power level and/or data rate at which data is transmitted over the link based on the *predicted* path loss and noise factor.

The details of the rejected claims and the cited references will now be discussed.

As discussed in the Remarks of the previous Response, an embodiment of the present invention provides a technique for determining a power level and/or rate at which data is transmitted over a link between source and destination nodes in a wireless ad-hoc communications network. As described in the specification and as can be appreciated by one skilled in the art, a wireless ad-hoc communications network comprises a plurality of mobile and stationary nodes that can communicate with each other directly or via one or more other nodes that operate as a router or routers for data packets being sent between nodes. In other words, an ad-hoc communications network does not employ base stations as do, for example, cellular telephone networks. As can further be appreciated by one skilled in the art, an ad-hoc communications network is capable of self-healing or, in other words, establishing different paths or links between nodes when an existing path becomes unusable. For instance, if a node in a path becomes inoperative or inaccessible, the other nodes in the path will establish communication with a different node and use that different node to reestablish the path.

Amended independent claim 1 defines this embodiment as a method for determining a power level and/or rate at which data is transmitted over a link between source and destination nodes in a wireless ad-hoc communication network. The method comprises the steps of predicting path loss in the link as a function of time based on information provided to the source node from the destination node pertaining to characteristics of at least two messages that were transmitted by the source node for receipt by the destination node, determining a noise factor

representative of noise at the destination node, and calculating the power level and/or rate at which the data is transmitted over the link from the source node to the destination node based on the *predicted* path loss and the noise factor. The operations associated with predicting path loss are described, for example, beginning at paragraph 0032. Amended independent claim 13 defines the embodiment as a computer readable medium of instructions for performing the operations recited in amended independent claim 1.

The Mallinckrodt patent teaches a power control technique for a cellular mobile communications system employing integrated satellites and terrestrial nodes to prevent fading, shadowing, interference and other problems. As described, for example, in column 3, lines 56-59 and beginning at column 10, line 40, the technique computes the path loss between a transmitter and receiver (e.g., between a transmitter of a satellite 20 and a receiver of a user unit 22) based on the strength of the received signal and information contained in the transmitted signal pertaining to the transmit power. The quality of received information is estimated using the Signal-to-Noise Ratio (SNR) and the bit error rate. The transmit power of the transmitter can then be adjusted so as to achieve the desired signal quality.

Applicant respectfully submits that unlike the claimed embodiments of the present invention, the Mallinckrodt patent fails to teach or suggest predicting the path loss of the link between a transmitter and receiver as a function of time based on information provided from the destination node to the source node pertaining to the characteristics of at least one message transmitted from the source node to the destination node. As discussed above, the Mallinckrodt patent relates to CDMA cellular communication networks where the transmit power levels are very high in order to cover the large distances typically present between the mobile telephones

and fixed base stations. In this type of system, the level of path loss is affected only by very small and smooth variations over time. Hence, as can be appreciated by one skilled in the art, it is not necessary for the Mallinckrodt system to predict the variation of the path loss as a function of time.

On the contrary, ad-hoc networks can be fully mobile, and generally operate at very low power because the nodes are typically at much smaller distances apart than are mobile terminals in cellular telephone CDMA systems. For these reasons, the path loss experienced over links between nodes in ad-hoc networks varies much faster than in cellular telephone systems. This variation in path loss cannot be ignored, but rather, is used for predicting the path loss level so that measures can be taken, such as adjusting transmission power level and/or transmission data rate, to prevent a loss of connection between two mobile nodes when the two mobile nodes move away one from another at very high speed.

Granted, column 10, lines 59-61 of the Mallinckrodt patent state that signal quality "depends on noise and interference level, and on the variability of signal loss over time". Applicant respectfully submits that at best, this passage teaches that signal losses can be measured at various times and the signal loss trends can be tracked over a period of time. However, Applicant respectfully submits that in no way does this or any other passage of the Mallinckrodt patent teach or suggest the *prediction* of *path loss* as a function of time.

In addition to these differences between the claimed embodiments and the teachings of the Mallinckrodt patent, Applicant respectfully submits that as can be appreciated by one skilled in the art, the term "noise" as used in the Mallinckrodt patent refers to the energy carried by other traffic channels on the same frequency channel as a channel of interest. On the contrary,

Applicant notes that independent claims 1 and 13 explicitly define the "noise" as being "at the destination node". Applicant respectfully submits that this type of "noise" refers to energy originating from sources not related with the operation of the network, such as from microwave ovens in civilian applications and from intentional jamming that can occur in military applications. Also, in the Mallinckrodt patent, the "noise" is determined by the bit error rate (BER) of the signals received by the CDMA decoder. In this context, the BER level is important for balancing the energy between various traffic channels sharing the same frequency. On the contrary, in an ad-hoc environment as in the claimed embodiments, the "noise factor" can be estimated as the relative occurrence of incorrectly received messages in relation to all received messages.

Concerning the Honkasalo et al. patent, Applicant submits that like the Mallinckrodt patent and as admitted by the Examiner, the Honkasalo et al. patent teaches a CDMA network which is unlike an ad-hoc network as demonstrated above. The Examiner relies on the Honkasalo patent as allegedly teaching that a transmit data rate can be determined based on transmit power.

Applicants respectfully submit, however, that the Honkasalo patent fails to make up for the deficiencies in the teachings of the Mallinckrodt patent as discussed above. That is, the Honkasalo patent fails to teach or suggest the path loss predicting and "noise factor" determining operations which are not sufficiently taught by the Mallinckrodt patent. Moreover, even though the Honkasalo patent may teach that the data rate is related to the transmit power, the Honkasalo patent fails to teach that the transmit power and/or data rate are calculated based on this calculated noise factor as well as the *predicted* path loss.

Concerning the Haartsen patent, Applicant respectfully submits that this patent teaches a system and method for establishing ad-hoc communication *sessions* between communication terminals in a CDMA wireless system. As can be appreciated by one skilled in the art, an ad-hoc CDMA session is a connection maintained for a limited time between one base station and one client. Applicant respectfully submits that no motivation exists to employ the techniques taught by the Mallinckrodt and Honkasalo patents in the system taught by the Haartsen patent or to modify the Mallinckrodt and Honkasalo systems to employ the ad-hoc *session* methodology taught by the Haartsen patent. However, even if such motivation did exist to combine the teachings, the Haartsen patent fails to teach or suggest the path loss predicting and "noise factor" determining operations discussed above. Hence, the teachings of the Haartsen patent do not make up for the deficiencies in the teachings of the Mallinckrodt and Honkasalo patents.

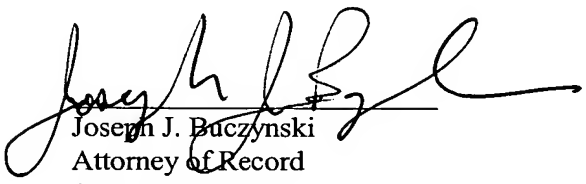
For all these reasons, Applicant respectfully submits that one skilled in the art would not have found it obvious or possible to achieve the embodiments of the present invention as recited even in amended independent claims 1 and 13 based on the teachings of the Mallinckrodt, Honkasalo and Haartsen patents. Accordingly, amended independent claims 1 and 13, and all of their dependent claims, should be allowable.

In addition, new dependent claims 33-38 are being added which depend from amended claim 1 or amended claim 13 and define further details of the path loss predicting operation, such as the use of a "forget factor". Applicant submits that in no way do any of the cited patents teach or suggest these additional features. Furthermore, new dependent claims 39 and 40 are being added which depend from amended independent claims 1 and 13, respectively, and specify that the transmit power level and data rate are calculated in a manner that minimizes the

amount of energy used for transmitting the information as defined in equation (5) in paragraph 0053. Applicant respectfully submits that the cited patents also fail to teach or suggest this feature. Accordingly, these new dependent claims should be allowable by virtue of their dependency on amended independent claims 1 and 13 and in their own right.

In view of the above, it is believed that the subject application is in condition for allowance, and notice to that effect is respectfully requested. However, should the Examiner have any questions, the Examiner is invited to contact the undersigned at the number indicated below.

Respectfully submitted,



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